Please replace the paragraph spanning lines 4-8 on page 1 of the application with the following:

-- The present application is related to U.S. Patent No. 6,152,876, filed October 19, 1998, entitled "Method for Non-Invasive Analyte Measurement with Improved Optical Interface", and U.S. Patent No. 5,935,062, filed June 9, 1997, entitled "Diffuse Reflectance Monitoring Apparatus", both assigned to the same assignee as the present application. --

Please replace the paragraph spanning lines 3-15 on page 3 of the application with the following:

-- Improved methods and apparatus for gathering and analyzing a near-infrared tissue spectrum for an analyte concentration are disclosed in commonly assigned U.S. Patent applications and issued patents. U.S. Patent No. 5,655,530 and U.S. Patent No. 5,823,951, filed April 18, 1997, entitled "Method for Non-invasive Blood Analyte Measurement with Improved Optical Interface" relate to near-infrared analysis of a tissue analyte concentration which varies with time, with a primary focus on glucose concentrations in diabetic individuals. The methods and apparatus include placing a refractive index-matching medium between a sensor and the skin to improve the accuracy and repeatability of testing. U.S. Patent No. 6,152,876, filed October 19, 1998, entitled "Method for Non-Invasive Blood Analyte Measurement with Improved Optical Interface" discloses additional improvements in non-invasive living tissue analyte analysis. The disclosure of each of these three applications or patents are hereby incorporated by reference. --

Please replace the paragraph spanning line 16, page 3 to line 7, page 4 of the application with the following:

-- U.S. Patent No. 5,636,633 relates, in part, to another aspect of accurate non-invasive measurement of an analyte concentration. The apparatus includes a device having transparent and reflective quadrants for separating diffuse reflected light from specular reflected light. Incident light projected into the skin results in specular and diffuse reflected light coming back from the skin. Specular reflected

light has little or no useful information and is preferably removed prior to collection. U.S. Patent No. 5,935,062, filed June 9, 1997, entitled "Improved Diffuse Reflectance Monitoring Apparatus", discloses a further improvement for accurate analyte concentration analysis which includes a blocking blade device for separating diffuse reflected light from specular reflected light. The blade allows light from the deeper, inner dermis layer to be captured, rejecting light from the surface, epidermis layer, where the epidermis layer has much less analyte information than the inner dermis layer, and contributes noise. The blade traps specular reflections as well as diffuse reflections from the epidermis. The disclosures of the above patent and application, which are assigned to the assignee of the present application, are also incorporated herein by reference. --

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Please replace the paragraphs spanning lines 19-23, page 7 of the application with the following:

-- Fig. 2 is a partial cross-sectional view of an alternative embodiment of a sensor element coupled to opposite sides of a skin surface via an indexing-matching fluid;

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Fig. 3 is a graphical representation of experimental data showing the improvement in accuracy and repeatability of a sensor coupled to the skin via an index-matching medium; --

Please insert the following paragraphs beginning at line 24, page 7 of the application as follows

--Fig. 4 is a block diagram describing an identification procedure using near-infrared tissue analysis;

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Fig. 5 depicts an alternate identification procedure using near-infrared tissue analysis;

Fig. 6 is a functional diagram of the identification system; and

Fig. 7 is a block diagram representing the configuration of the system.--

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Please replace the paragraphs spanning line 13, page 14 to line 2, page 15 of the application with the following:

-- In both embodiments depicted in Figs. 1 and 2, an output sensor 26 is utilized to receive reflected or transmitted light energy from the tissue 10. In a preferred embodiment, a specular control device is incorporated to separate the specular reflected light from diffusely reflected light. Such devices are disclosed in co-pending and commonly assigned U.S. Patent No. 5,935,062, filed June 9, 1997, and entitled "Diffuse Reflectance Monitoring Apparatus", the disclosure of which is incorporated herein by reference. As described in conjunction with a method of analysis below, the embodiment of Fig. 1 has an output sensor 26 which receives reflected light energy, while the embodiment of Fig. 2 includes an output sensor 26 which receives transmitted light through the tissue 10. As with the input element 20, the output element 26 is preferably an optical lens. Other optical collection means may be incorporated into an output element 26, such as a multiple lens system, tapered fiber, or other beam-collection means to assist in directing the light energy to the spectrum analyzer 30. --

Please replace the paragraphs spanning line 20, page 21 to line 13, page 22 of the application with the following:

-- In a preferred method as represented in Figure 5, the verification task is implemented when a person seeks to perform an operation for which there are a limited number of people authorized (e.g., perform a spectroscopic measurement, gain entry into a room, achieve control over an interlocked vehicle or piece of machinery, etc.). The person's NIR spectral data 500 is used for verification of the person's identity. In this preferred method, the person uses a spectroscopic measurement device to collect one or more tissue spectra 510. Before, during, or after the measurement, the person also states who they are (e.g. "person X") by some means (personal ID number, name, badge, etc.). The verification task is then the confirmation 530 that the person is who they stated by comparison of the near-infrared spectrum with one or more previously recorded and verified spectra

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from person X. Equivalently, if the verification task is associated with an operation for which only a single person is authorized, then the task simplifies to an assurance that the sole authorized individual is attempting the operation.

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In analyzing the data 520, all preferred implementations of the proposed verification methodology generate a difference spectrum, D(ν), using the spectrum just collected from the person wishing authorization, V(ν), and the prestored authorized spectrum, A(ν), or spectra corresponding to the person whose identification was stated:--

Please replace the paragraph spanning lines 4-10 on page 24 of the application with the following:

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-- The second method of generating underlying spectral shapes relates to the development of a generic model as described in co-pending U.S. Patent No. 6,157,041 filed on even-date herewith, entitled "Methods and Apparatus for Tailoring Spectroscopic Calibration Models," the disclosure of which is incorporated by reference. In this application, the underlying spectral shapes are generated through a calibration procedure performed on intra-patient spectral features. The calibration is based upon measured analyte concentration features.--

Please replace the paragraphs spanning line 22, page 22 to line 3, page 24 of the application with the following:

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--The other key element of a preferred verification method as shown in Figure 6 is a spectral difference database 600 that was developed using the same mathematical operation as used for generating D(ν). The spectral differences (or ratio, etc.) in the spectral difference database are preferably formed from one or more people measured multiple times each 610. For robustness, the sampling of an individual person should span expected changes in the person's physiology, expected changes in or across the spectroscopic measurement devices, and changes in the measurement environment. In one preferred embodiment, spectral differences can be generated in a multitude of combinations of spectra from a

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given person, but should never be formed using spectra from different people. By filling the database with intra-patient difference spectra, typical inter-patient spectral differences are removed, and the resulting database contains only intra-patient spectral features as well as instrumental and environmental effects.

The verification task is accomplished through determining if the spectral difference, D(ν), is consistent with the spectral difference database 600 for the individual. If the identification that the person stated is accurate, the resulting difference spectrum, D(ν), will contain only intra-patient spectral features 620, and thus, be consistent with the database. Conversely, if the identification is not accurate, D(ν) will contain inter-patient spectral features and be incompatible with the intra-patient spectral difference database for the individual, indicating that the verification failed 630.

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As shown in Figure 7, consistency with the database 710 can be ascertained in a variety of ways. In preferred methods discriminant analysis techniques 720 incorporated in programs 730 of a computer 700 are used. These methods rely upon establishing the underlying spectral shapes (factors, loading vectors, eigenvectors, latent variables, etc.) in the spectral database, and then using standard outlier methodologies (spectral F ratios, Mahalanobis distances, Eucliden distances, etc.) to determine the consistency of D(ν) with the database. The underlying spectral shapes can be generated by multiple means as disclosed herein. First, the underlying spectral shapes can be generated based upon simple spectral decompositions (eigen analysis, Fourier analysis, etc.).--

Please replace the paragraph spanning lines 7-22 on page 29 of the application with the following:

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-- In one method depicted in Figure 4, when identity verification is desired, a tissue spectrum 400 and purported identity are obtained 440 from the target individual. The tissue spectrum is calculated 460 to generate the same factors used to cluster the calculated datapoints 450 in the spectral database. The spectral difference 420 between the target spectrum and the database spectra are calculated. One calculation measures the Mahalanobis distance between the

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target spectrum and the database spectra for the purported identity. If the distance is less than a threshold distance, then the purported identity can be positively verified 410. Another spectral difference includes computing a spectral residual, or difference spectrum between the target spectrum and a cumulative spectrum, for the purported individual from the database. In evaluating 430 the spectral residual, the identity can be positively identified if the residual is less than a preset threshold. In one method, both the spectral residual and a difference, such as the Mahalanobis distance, must be below their respective thresholds before identity is positively established. In one method, threshold values were set for both spectral distance and spectral residual magnitude to include 99% of the database spectra. In another method, threshold values were set for both spectral distance and spectral residual magnitude to include 95% of the database spectra.--

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In the Drawings

Applicants have amended the drawings to include Figures 4-7 accompanying this amendment.

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